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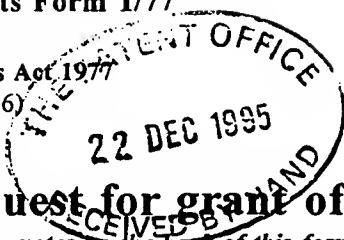
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## Request for grant of a patent

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1. Your Reference

HL53828/000/MJH

2. Patent application number

(The Patent Office will fill in this part)

**9526304.2**

**22 DEC 1995**

3. Full name, address and postcode of the or of  
each applicant (underline all surnames)

British Sky Broadcasting Limited  
Centaurus Business Park,  
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Middlesex TW7 5QD

Patents ADP number (if you know it)

If the applicant is a corporate body, give the  
country/state of its incorporation

0680305001

United Kingdom

*06856165001 el*

4. Title of the invention

Interactive Services Interface

5. Name of your agent (if you have one)

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WC2A 1AT~~

Patents ADP number (if you know it)

~~34001~~ ✓

*950001*

6. If you are declaring priority from one or more  
earlier patent applications, give the country  
and the date of filing of the or of each of these  
earlier applications and (if you know it) the or  
each application number

Country

Priority application number  
(if you know it)

Date of filing  
(day/month/year)

United Kingdom

~~9519651.5~~

~~27.9.95~~

United Kingdom

~~9510429.5~~

~~22.5.95~~

*11/77 14.5 K.*

7. If this application is divided or otherwise  
derived from an earlier UK application,  
give the number and the filing date of  
the earlier application

Number of earlier application

Date of filing  
(day/month/year)

8. Is a statement of inventorship and of right  
to a grant of patent required in support of  
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Claim(s)	5
Abstract	1
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11. I/We request the grant of a patent on the basis of this application.

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Date 22nd December 1

12. Name and daytime telephone number of person to contact in the United Kingdom

J K Godsill  
0171 405 6093

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INTERACTIVE SERVICES INTERFACE

The present invention relates to a television receiver having an interactive services interface.

The present invention has particular relevance as  
5 part of a transmission system operating via satellite comprising a satellite dish and digital decoder in each home and a television receiver. A transmission system of this kind is described in copending UK patent applications 9510429.5 and 9519651.5. For further  
10 details of a transmission system of this kind, the interested reader is referred to these applications, the contents of which are incorporated herein by reference.

The present invention relates to an interactive  
15 services interface (ISI) to enable interactive services to be provided in a different environment from that of the menu-driven environment of the electronic programme guide (EPG) or intelligent EPG (IEPG) described in copending UK patent applications 9510429.5 and  
20 9519651.5, the information relating to EPG and IEPG in these copending applications being incorporated herein by reference.

In a first aspect of the invention, there is provided a television receiver comprising: storage  
25 means for storing data representing at least a first and second two-dimensional map, each map being subdivided into a finite plurality of elements; a remote control receiver responsive to input from a remote control; map selection means responsive to the remote  
30 control receiver for selecting one of the maps; lateral navigation means responsive to the remote control receiver for moving a pointer across the selected map between elements thereof; display means on which the pointer and a portion of the selected map comprising a  
35 fraction of the elements of that map is displayable; display management means for updating the portion of

the selected map to be displayed in response to movement of the pointer; and depthwise navigation means responsive to the remote control receiver for jumping from one map to another map, wherein the location of  
5 the pointer in the map prior to jumping determines the location of the pointer in the other map subsequent to jumping, said maps thus being conceptually stacked one behind each other to form a multi-planar stack of maps with said first two-dimensional map being a top map and  
10 said second two-dimensional map being a bottom map with any further such maps being intermediate maps.

In a second aspect of the invention there is provided a television set top unit comprising a memory buffer into which images to be displayed are  
15 continually read depending on a pointer location in a multi-planar stack of two-dimensional maps each subdivided into a plurality of elements.

In a third aspect of the invention there is provided a television set top unit comprising a CD-ROM  
20 drive into which a CD-ROM is loadable on which maps of the multi-planar stack of two-dimensional maps each subdivided into a plurality of elements are stored.

In a fourth aspect of the invention there is provided a satellite television system having means for  
25 loading into a memory buffer at a remote location adjacent images of portions of a two-dimensional map of a plurality of maps arranged in a multi-planar stack structure, each map being subdivided into a plurality of elements.

30 Television receivers according to some embodiments of the present invention are designed to allow ISI driven applications to be accessed via gateways in an EPG or IEPG menu-driven environment. An integrated user interface comprising an EPG or IEPG front end and  
35 having options selectable therefrom which are driven from the ISI is thus provided.

In the interactive services interface, unlike in linear and multilinear navigation structures which do not permit a user to view information laterally, a multi-planar structure is provided. This multi-planar  
5 structure allows both side-to-side (x-y axis) and forward-and-back (z axis) navigation within an environment which allows a user to perform browse and select operations. Two-dimensional maps are provided which each extend in a given x-y plane and which are  
10 conceptually stacked one behind another at different absolute or relative z locations.

In some embodiments of the invention, facilities are provided by which a viewer can browse categorically similar information by navigating laterally around a  
15 given map by means of arrow keys or some other suitable control facility and depthwise between different maps by means of a scalar control, such as a single key, or a bidirectional vector control, such as two keys, for jumping between maps in the positive and negative z  
20 directions respectively.

For a better understanding of the invention and to show how the same may be carried into effect, reference is now be made, by way of example, to the accompanying drawings, in which:-

25 Figure 1 is a block diagram of a satellite television digital decoder according to a first embodiment of the invention;

Figure 2 is a block diagram of a satellite television digital decoder according to a second  
30 embodiment of the invention;

Figure 3 is a block diagram of a satellite television digital decoder according to a third embodiment of the invention;

Figure 4 illustrates the key panel of a remote  
35 control for user control of the interactive services interface of any of the first to third embodiments;

Figure 5 shows a screen display of the electronic programme guide (EPG) which serves as a gateway through which "Shopping" can be selected to provide shopping under the interactive services interface of the first to third embodiments; and

Figure 6 illustrates a shopping application driven in an ISI driven environment and its coupling to an EPG driven environment.

It is noted that the embodiments described below are designed for use in the "Sky" system, so the following description is related specifically to "Sky" services.

Figure 1 is a block diagram of a digital encoder having an input 1 to receive the satellite signal from the LNB of the dish. This input connects in sequence to a tuner 2, QPSK demodulator 3, forward error corrector 4, transport demultiplexer 5, conditional access control module 6 and descrambler 7. These items are coupled by a bus to a microprocessor 8 and to ROM 9, RAM 10 (DRAM and SRAM) and flash (non-volatile and writable) memory 11. The microprocessor has data input from a remote control (e.g. infra-red) receiver 12 receiving user instructions from remote control 13. The descrambler feeds an audio decompression and processing circuit 14 and a video decompression and processing circuit 15. The video and audio decompression and processing circuits are also connected to the transport demultiplexer 5 by the bus. This enables menu displays generated in the microprocessor to be transmitted to the viewer instead of or in combination with programme material. These circuits 14 and 15, in the case of 15 via a PAL encoder 17, supply the appropriate signals to a UHF modulator 16 and SCART interface 18 for coupling to a television receiver. Two PC compatible ports, RS232 port 19 and a high speed port 20, are also available to allow digital

video, audio and data to be supplied to external data storage or data processing equipment. A modem 21 is connected to the bus and thence to a telecoms interface. For the interactive services interface, a  
5 small memory buffer 22, which can for example be housed in the set-top box, is provided into which images are continually read, depending on the user's location in the system. New images are loaded automatically into this memory, which acts as a buffer, and continually  
10 write over the previous images as the user navigates around the system.

Figure 2 is a block diagram of a second embodiment of the invention. The second embodiment differs from the first embodiment in that a mass storage device 11a,  
15 such as a CD-ROM drive or DAT deck, is provided instead of or as well as the memory buffer 11a. The mass storage device can for example be housed in the set-top box. A program containing, for example, the retailer products map images is loaded into the mass storage  
20 drive, for example a CD-ROM is loaded manually into a CD drive by the user. Once the user jumps past the retailer map the system reads the CD-ROM, DAT cassette etc. and displays the images as requested.

Figure 3 is a block diagram of a third embodiment  
25 of the invention. The third embodiment differs from the first embodiment in that a memory buffer 24 at a remote location is provided instead of or as well as the memory buffer 11a. The satellite system recognises the user's location in the system and loads the  
30 adjacent images into memory buffer 24.

Figure 4 shows the controls of the remote control 13. The basic functions ascribed to the keys are described in copending UK patent application 9510429.5 so that for the sake of brevity the description of the  
35 key functions in the following is limited to certain keys used for driving applications operative under the



interactive services interface of the first to third embodiments.

For example, the keys VCR, TV, Satellite, and On/Off, Guide, Box Office and Text are not described in  
5 the following. However, for further information relating to the functions of any of the keys illustrated in Figure 4, the interested reader is referred to the description of the corresponding figure in the copending UK patent application 9510429.5, these  
10 passages being incorporated herein by reference.

The arrow keys and the Select key are the principal keys used for user navigation around applications driven under the interactive services interface (ISI) as well within the electronic programme  
15 guide (EPG) or intelligent EPG (IEPG) from which ISI applications can be entered via suitable gateways.

Figure 5 is an example of a screen menu 30 in the EPG environment containing a gateway to allow entry into an ISI driven environment. On selection of the  
20 menu option number 3, labelled "Shopping", with the Select key of the remote control 13, the user enters the multi-planar structure driven by the television receiver having an interactive services interface according to any one of the first to third embodiments.

Figure 6 illustrates a shopping application driven in an ISI environment and its coupling to an EPG environment. The uppermost plane in Figure 6 shows the interactive services menu 30 of Figure 5 from which the ISI driven shopping application was entered as  
25 described above. On passage through the shopping gateway on the menu 30. a first grid plane 32 of the ISI driven shopping application is arrived at, this grid plane being a retailer map which can be browsed laterally in the manner described above across various  
30 retailers, any of which can be selected as desired by the user.  
35

Once a retailer has been selected in the retailer map, the user enters a second grid plane 34, designated a product/services map, in which the user is able to browse across a palette of products and services. In  
5 Figure 6, the viewer position is, by means of example at a gentlemen's outfitters.

If the user wants to know more about a product or service located at the current position, the following features are provided which are described with the  
10 example of a shirt as illustrated in Figure 6.

On selection of the shirt in the product/services map in grid plane 34, the user is shown a screen 36 containing a detail view of the shirt and also including basic ordering information relating to the  
15 shirt.

From screen 36 an order screen 38 can then be entered which allows the colour and size of the shirt and also the number of shirts required to be selected.

Next a confirmation screen 40 is displayed in  
20 which the full order details are shown and from which the final purchasing decision is made.

In an ISI driven application in accordance with any of the first to third embodiments of the invention, such as the shopping application described above, two-  
25 dimensional maps are provided which each extend in a given x-y plane and which are conceptually stacked one behind the other at different absolute or relative z locations. Viewers can browse categorically similar information by navigating laterally and depthwise,  
30 moving the viewer between elements of finite area in a given map and between different maps.

The Select key is positioned centrally with respect to the arrow keys and is used for depthwise navigation in the z plane, moving the user from a  
35 category map in one x-y plane to another category map in another x-y plane, either closer to or farther away

from the currently selected category map.

The red, green, yellow and blue coloured keys (R, G, Y, B) allow a user to select specific screens or pieces of information as indicated on screen.

- 5        Each map, in the shopping example the retailer map and the product/service map, is broken into 256 grid units. The screen displays only 16 grid units at any one time. The decision to limit the grid to 256 units is based on reasonable estimates of a user
- 10       comprehension and the estimated cost of being an interactive service provider, such as a retailer, on this system. The ability to expand this grid dimension is an important feature of the interface design.

- 15       It is envisaged that retailers and other service providers will lease space on these grid maps, onto which they will "display" their products or branded messages. As the number of retailers within the system grows, the grid maps can be expanded or sub-divided into separate maps.

- 20       The x/y axis movement can be in full screen, half screen or quarter screen increments depending on the information being browsed. This incrementation decision is determined at the program level, contingent on the browsing speed desired by the owner of the map
- 25       and is not (necessarily) a part of the user's navigation decision.

- 30       The movement across the map is perceived as a change of location on a horizontal surface. This is accomplished by sliding from one screen to the next.
- 35       The ability to witness this change as sliding a viewing window from one spot to another is crucial to user orientation, enabling the user to retain a sense of position within the full map notwithstanding the fact that only a portion thereof is displayed at any one time.

Each map is finite and has boundaries which cannot

be navigated across. However, user scenarios are also possible in which a viewer can browse out of one retail environment into the adjacent retail space without navigating back one level and entering the retailer via  
5 their branded access point. Co-opitition between adjacent retailers could forge relationships where navigation across boundaries in the product browse level would be desirable and good for each business.

The x/y directional arrows and the numeric display  
10 of product choices are displayed dynamically on screen by the system and are not part of the image of the maps. For example, teletext-style typography can be provided for displaying the arrow and product choice information, these image components floating above the  
15 other elements of the screen image. The system then monitors the user's location on the map to allow directional arrows to be displayed or removed as appropriate.

Each possible directional movement from the  
20 current location being displayed is stored in a memory buffer in an anticipatory fashion, ready to respond to any movement to a new location. The x/y navigation should have the response time of a video game, so that a viewer can quickly scan the area of a map and develop  
25 a sense of the relative locations of its contents.

An interpassive viewing option is possible within selected interactive services areas. This can be described as an auto-pilot mode which allows a viewer to sit back and be taken on a tour of an interactive  
30 service area. This gives a more passive viewing attitude to the interactive services for viewers who want to browse but do not want to do the work of directional decision making. The system can be interrupted at any time to further investigate a  
35 feature which interests the viewer.

An audio signal can be rapidly loaded and

delivered at the same time as, or even slightly ahead of, the picture component when choices are made.

Specific locations within each interactive service area can be tagged or marked in order to be able to  
5 return to them quickly at a later time. Each retail location is assigned a virtual address (e.g. a three digit number) which can be entered from an information screen and which instantaneously takes the user to the relevant location.

10 As described above, the images adjacent to the user's current location must be instantly available in response to a user command issued from the remote control unit. This can be accomplished in a number of ways, of which the first, second and third embodiments  
15 described above are but examples. The implementation chosen will depend on the design of the entire delivery system.

CLAIMS

1. A television receiver comprising:
  - storage means for storing data representing at least a first and second two-dimensional map, each map
  - 5 being sub-divided into a finite plurality of elements;
  - a remote control receiver responsive to input from a remote control;
  - map selection means responsive to the remote control receiver for selecting one of the maps;
  - 10 lateral navigation means responsive to the remote control receiver for moving a pointer across the selected map between elements thereof;
  - display means on which the pointer and a portion of the selected map comprising a fraction of the
  - 15 elements of that map is displayable;
  - display management means for updating the portion of the selected map to be displayed in response to movement of the pointer; and
  - depthwise navigation means responsive to the
  - 20 remote control receiver for jumping from one map to another map, wherein the location of the pointer in the map prior to jumping determines the location of the pointer in the other map subsequent to jumping, said maps thus being conceptually stacked one behind each
  - 25 other to form a multi-planar stack of maps with said first two-dimensional map being a top map and said second two-dimensional map being a bottom map with any further such maps being intermediate maps.
- 30 2. A television receiver according to claim 1, wherein the depthwise navigation means also provides for jumping from the bottom map out of the multi-planar stack into a different screen environment.
- 35 3. A television receiver according to claim 1 or 2, wherein the map selection means has a facility for

selecting the top map, thus providing entry into the multi-planar stack at the top map.

4. A television receiver according to any one of the  
5 preceding claims, wherein each map is sub-divided into rectangular elements.

5. A television receiver according to any one of  
claims 1 to 3, wherein each map is sub-divided into  
10 square elements.

6. A television receiver according to any one of the  
preceding claims, wherein said fraction of the elements  
of a map displayable is less than or equal to one  
15 ninth.

7. A television receiver according to claim 6,  
wherein said fraction is less than or equal to one  
sixteenth.  
20

8. A television receiver according to claim 7,  
wherein said fraction is less than or equal to one  
twenty-fifth.

25 9. A television receiver according to any one of the  
preceding claims, wherein the lateral navigation means  
provide for pointer movement in increments of one  
element.

30 10. A television receiver according to any one of the  
preceding claims, wherein the lateral navigation means  
provide for pointer movements in increments  
corresponding to a plurality of elements, to provide  
incremental pointer jumps of a size of up to or equal  
35 to the dimension of the portion of the map being  
displayed.

11. A television receiver according to any one of the preceding claims, wherein an element or group of adjacent elements in one map correspond to a group of adjacent elements or a larger group of adjacent elements respectively in another map positioned in the multi-planar stack depthwise below the said one map so as to allow display expansion via the depthwise navigation means.
12. A television receiver according to any one of the preceding claims, wherein, in response to pointer movement, the display management means provides for a sliding lateral movement of the portion of the selected map to be displayed.
13. A television receiver according to any one of the preceding claims, wherein each map has a lateral boundary and the lateral navigation means prevent navigation across that boundary.
14. A television receiver according to any one of the preceding claims, wherein each map has a lateral boundary and, for selected one or ones of said maps, the lateral navigation means allows navigation across that boundary into a designated entry location in another of said maps.
15. A television receiver according to any one of the preceding claims, comprising a memory buffer for storing data required in response to any possible lateral pointer movement from its current location.
16. A television receiver according to any one of the preceding claims, comprising remote control receiver emulation means for providing a user interruptible sequence of instructions to the lateral navigation



means, thus providing a tour of the selected map during which user control of the pointer movements via the remote control is substituted by input from the emulation means.

5

17. A television receiver according to claim 16, wherein said sequence is generated randomly.

18. A television receiver according to claim 16,  
10 wherein said sequence follows a predetermined tour.

19. A television receiver according to any one of the preceding claims, comprising audio signal generation means for delivering audio signals in conjunction with  
15 the display.

20. A television receiver according to any one of the preceding claims, comprising tagging means for tagging a location in a map, to which location the pointer can  
20 be returned by a jump operation at a later time.

21. A television set top unit comprising a memory buffer into which images to be displayed are continually read depending on a pointer location in a  
25 multi-planar stack of two-dimensional maps each subdivided into a plurality of elements.

22. A television set top unit comprising a CD-ROM drive into which a CD-ROM is loadable on which maps of  
30 the multi-planar stack of two-dimensional maps each subdivided into a plurality of elements are stored.

23. A satellite television system having means for loading into a memory buffer at a remote location  
35 adjacent images of portions of a two-dimensional map of a plurality of maps arranged in a multi-planar stack

structure, each map being subdivided into a plurality of elements.

24. A television decoder for reception of digital  
5 television streams, the decoder comprising a  
controllable tuner, a controllable demultiplexer, and  
computer means, including memory, for controlling the  
tuner and demultiplexer, the computer means defining a  
10 first memory area for storing programme data comprising  
for each programme a programme identifier and tuning  
data, a second memory area for storing programme  
identifiers for a user display channel, means by which  
a user can select any one of a plurality of the  
programmes the data of which is stored at the first  
15 memory area, a third memory area for storing maps of  
the multi-planar stack.

25. Use of a hand-held remote control unit for  
navigation within a multi-planar stack of multi-element  
20 maps, allowing depthwise navigation between maps and  
lateral navigation between elements of a map.

26. A television receiver substantially as  
hereinbefore described with reference to Figures 1 to 6  
25 of the accompanying drawings.

ABSTRACT  
INTERACTIVE SERVICES INTERFACE

A television receiver having an interactive services  
5 interface provides a multi-planar structure which  
allows lateral (x-y axis) and depthwise (z axis)  
navigation within an environment allowing user driven  
browse and select operations. Two-dimensional maps  
(32) and (34) are provided which each extend in a given  
10 x-y plane, which are each sub-divided into elements of  
finite area and which are conceptually stacked one  
behind another at different absolute or relative z  
locations. The multi-planar structure is accessible  
via a menu (30) in an electronic programme guide.  
15 Navigation between and across map planes (32, 34) is  
possible and further conventional screens (36, 38, 40)  
are sequentially accessible from elements of the map  
(34).

20 [Figure 6]

FIG. 1

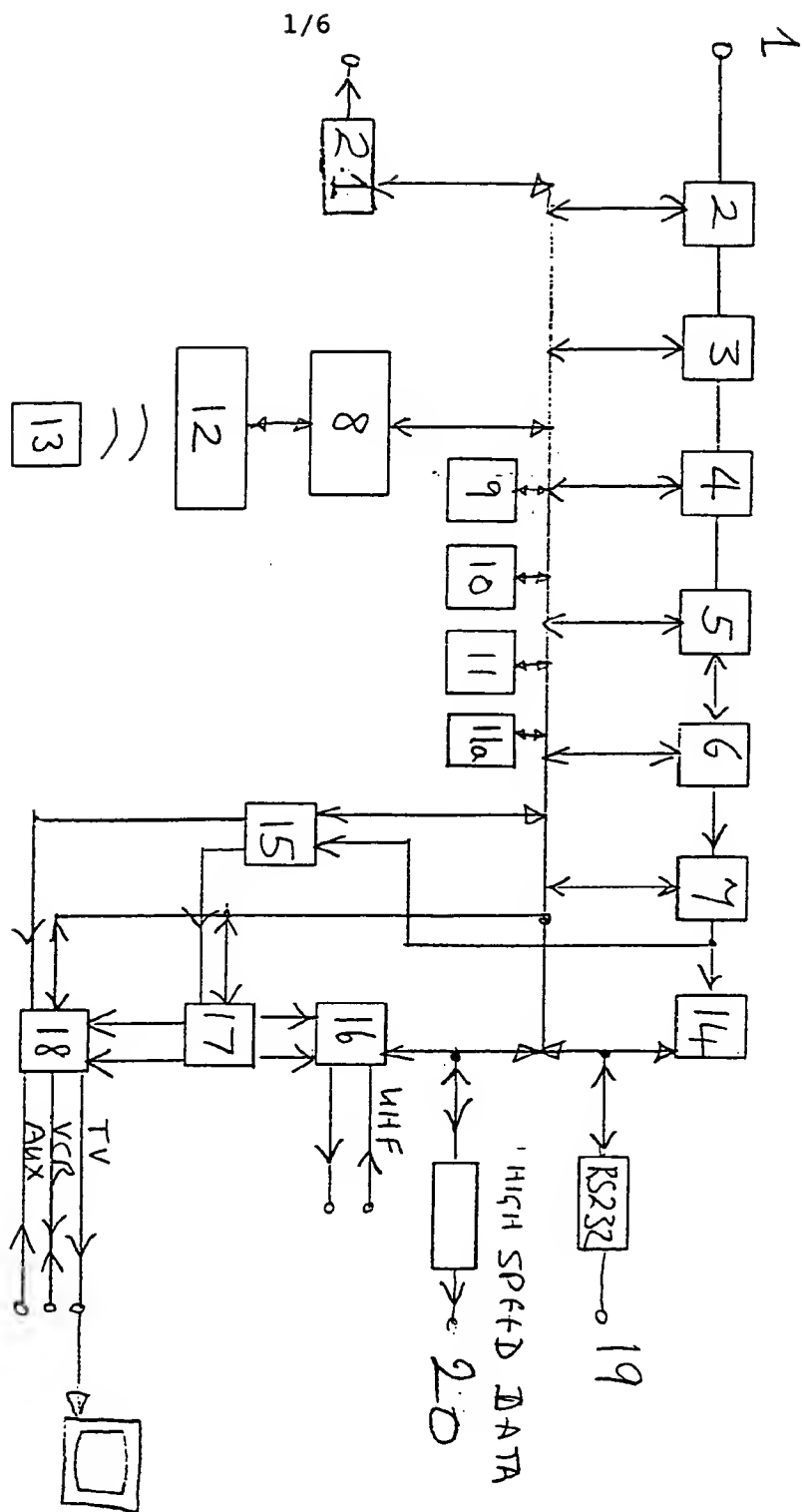
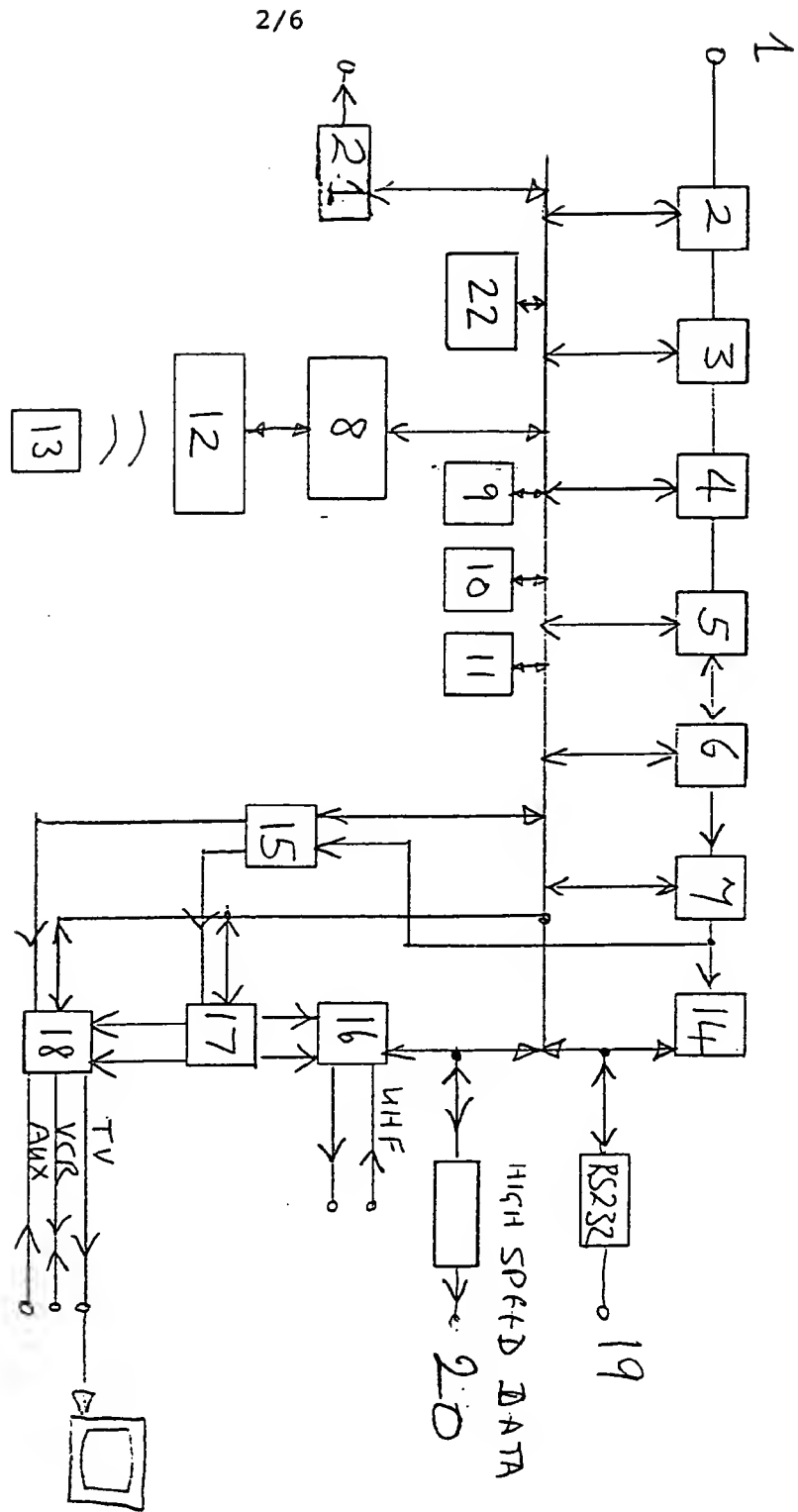


FIG. 2



F-6. W

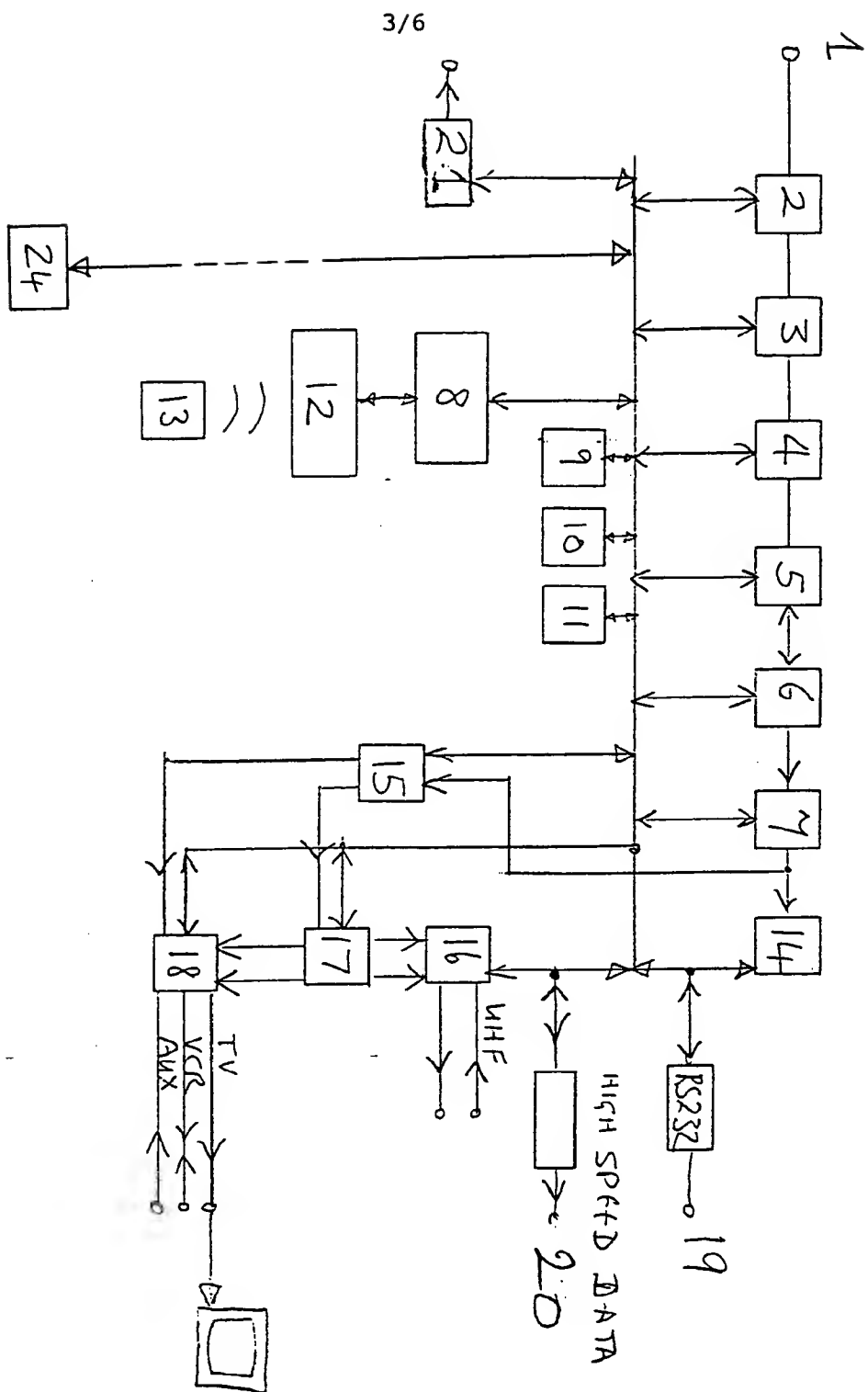


FIG. 4

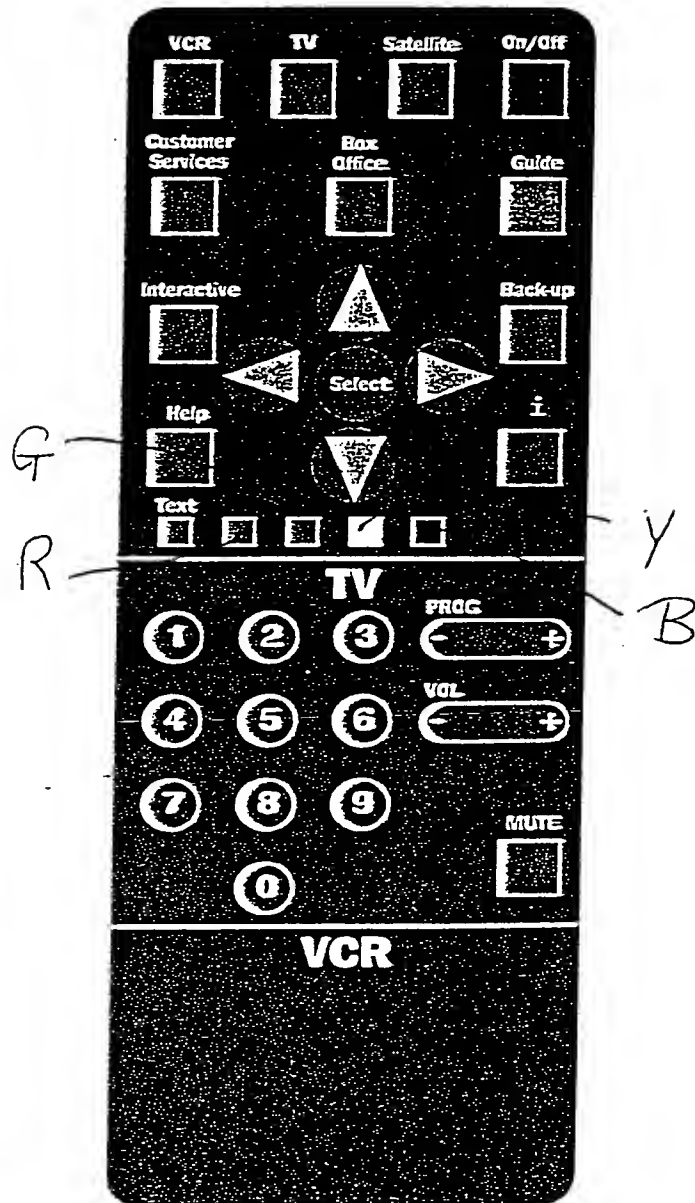


FIG. 5

Sky Interactive Services - Level 1

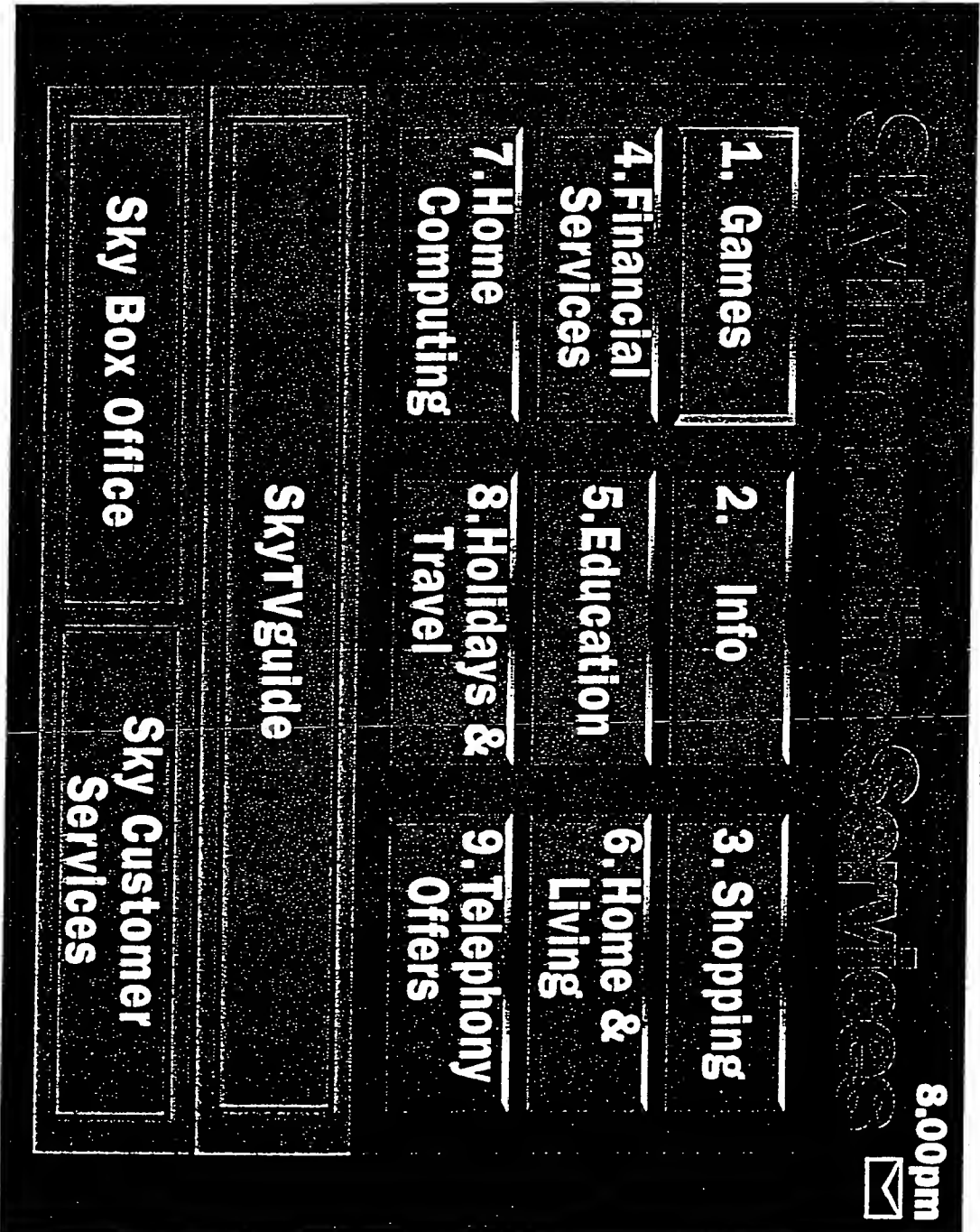




FIG. 6

